No. 9000096

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

USDA—ARS, Utah Agricultural Experiment Station, USDA—SCS

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, (THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT ETY THEREFROM,* TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

(*Waived, except that this waiver shall not apply to breeder seed, undation seed, labeling requirements, and blending limitations.)

RS WHEATGRASS

'NewHy'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this 30th day of September in the year of our Lord one thousand nine hundred and ninety-three.

Attest:

Kenneth A. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Mike Espy

Secretary of Agriculture

APPROVAL EXPIRES 2-28-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)
USDA-ARS, Utah Agricultural Experiment Station, USDA-SCS

2. TEMPORARY DESIGNATION
RS Hybrid

3. VARIETY NAME
NewHy

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*
USDA-ARS
Utah State University
Logan, UT 84322-6300

5. PHONE *(Include area code)*
(801) 750-3069

FOR OFFICIAL USE ONLY

PVPO NUMBER
9000096

6. GENUS AND SPECIES NAME
Elytrigia repens X Pseudoroegneria spicata

7. FAMILY NAME *(Botanical)*
Poaceae

FILING
DATE
Feb. 26, 1990
TIME
☐ A.M. ☐ P.M.

8. KIND NAME
Rs Hybrid

9. DATE OF DETERMINATION
December 1989
AAA per letter 17 Sept 1993

FEES RECEIVED
AMOUNT FOR FILING
$ 2150.—
DATE
Feb. 26, 1990
AMOUNT FOR CERTIFICATE
$ 250.00
DATE
Sept. 13, 1993

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Government agencies, state Agricultural Experiment Station

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
USDA-ARS
Utah State University
Logan, UT 84322-6300

PHONE *(Include area code)*: (801) 750-3069

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. ☐ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)*
☒ Yes *(If "Yes," answer items 16 and 17 below)* ☐ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ Yes ☐ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ Foundation ☐ Registered ☒ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ Yes *(If "Yes," give date)*
☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES ?
☐ Yes *(If "Yes," give names of countries and dates)*
☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT
T. H. Asay
DATE
11/7/89

SIGNATURE OF APPLICANT

DATE

1

FORM LS-470
(3-86)

Edition of 7-84 obsolete.

EXHIBIT A

GENEALOGICAL AND BREEDING PROCEDURE DESCRIPTION

FOR

'NEWHY' RS WHEATGRASS

NewHy is an advanced generation of an interspecific hybrid between quackgrass [*Elytrigia repens* (L.) Nevski] and bluebunch wheatgrass [*Pseudoroegneria spicata* (Pursh) A. Love]. The parental population of NewHy was initially established in 1962 (Dewey 1967). The F_1 hybrid was pentaploid (2n=35), meiotically irregular, beset with chlorophyll deficiencies, and in general, had poor vegetative vigor. Although the hybrid plants were only partially fertile, adequate seeds were produced for generations to be advanced without chromosome doubling. From the F_1 to F_5 generation, selection was based largely on fertility (seeds/spike) and was restricted to plants with characteristics of both parental species. Plants with excessive rhizome development were excluded. More intense selection was initiated in the F_5 generation. Objectives were to combine the vigor, productivity, salinity tolerance, and persistence of quackgrass with the drought resistance, caespitose growth habit, seed quality, and forage quality of bluebunch wheatgrass.

Two F_7-F_8 germplasm pools, designated RS-1 and RS-2, were released to breeders in 1980 (Asay and Dewey 1981). These two lines were morphological similar with the exception that RS-2 was slightly more rhizomatous than RS-1. Two additional cycles of selection were completed with the combined RS-1 and RS-2 breeding populations to develop the parental lines of the NewHy RS Wheatgrass cultivar.

Breeders seed will be maintained by the USDA-ARS at Logan, Utah. Foundation seed will be produced from breeders seed by USDA-ARS at Logan and USDA-SCS at Los Lunus, New Mexico and will be available by Fall 1989. Foundation seed will be distributed by the Utah Crop Improvement Association and the USDA-SCS. Certified seed will be produced from Foundation seed. Seed will be sold only as a class of certified seed.

Asay, K. H. and D. R. Dewey. 1981. Registration of Agropyron repens X A. spicatum germplasms RS-1 and RS-2 (Reg. No. GP11 and GP12). Crop Sci. 21: 351.

Dewey, D. R. 1967. Synthetic hybrids of New World and Old World Agropyrons: III. Agropyron repens X tetraploid Agropyron spicatum. Am. J. bot. 54:93-98.

EXHIBIT B

DESCRIPTION AND NOVELTY STATEMENT

'NEWHY' RS WHEATGRASS

Quackgrass (*Elytrigia repens*) X Bluebunch wheatgrass (*Pseudoroegneria spicata*)

NewHy is a fertile hybrid (2n=42) with morphological characteristics of both parental species. Rate of phenological development is intermediate to the parents and anthesis occurs from mid to late June in nurseries near Logan.

Spike and seed characteristics of the hybrid are similar to quackgrass; however, other vegetative aspects are markedly different. The hybrid has a more upright growth habit and it produces fewer and less vigorous rhizomes than the quackgrass parent. Rhizome development in the hybrid population ranges from less than 0.1 m to slightly over 1.0 m per year on range sites receiving from 33 to 38 cm annual precipitation. On these sites, over 70% of the plants develop rhizomes of less than 0.4 m during the season and the population averages approximately 0.3 -.4 m.

The hybrid is more resistant to drought than quackgrass but less so than bluebunch wheatgrass. It is best adapted to slightly saline or alkaline range sites receiving at least 33 cm (13 in) of precipitation annually. The new grass has demonstrated excellent resistance to excess soil salinity. In trials on a saline meadow near Miles City, Mont., the hybrid was more salt tolerant than Garrison creeping foxtail (*Alopecurus arundinaceus*), Altai wildrye (*Leymus angustus*), and Russian wildrye (*Psathyrostachys juncea*). In greenhouse trials, NewHy was more tolerant of salinity than intermediate wheatgrass (*Thinopyrum intermedium*), western wheatgrass (*Pascopyrum smithii*), tall fescue (*Festuca arundinacea*), and Garrison creeping foxtail. Tall wheatgrass (*Thinopyrum ponticum*) was the only entry in these tests to have greater tolerance to salinity than NewHy.

The forage yield and quality of the RS hybrid has been evaluated on several range sites in the Intermountain West and to a lesser extent in the Great Plains. Results from the Utah State University Experiment Station in NW Utah are typical. Poor seed germination resulted in stands of less than 50% during the establishment year. Consequently, dry matter yield of the hybrid was significantly ($P < 0.05$) less than 'Greenar' intermediate wheatgrass and 'Hycrest' crested wheatgrass during the following season. As stands improved through tillering and rhizome development during the third and fourth years, NewHy produced more forage than any of the other 16 entries included in the trial. It is noteworthy that NewHy, unlike its quackgrass parent, did not spread beyond its plot borders into adjacent plots. Similar trends were observed in a trial established in the foothills of the LaSal Mountains in Southern Utah, at an altitude of 1,900 m and with an annual average of 33 cm precipitation. Although initial stands were better than at Blue Creek, forage yield of NewHy during the first production year was significantly less than the mean of the rest of the entries in the trial. In the two subsequent years, however, the productivity of the hybrid improved dramatically and was equivalent to the most productive entries in the trial.

The hybrid has shown moderate susceptibility to injury by the grass billbug (*Sphenophorus parvulus*) under soil and moisture conditions where this insect is a potential problem.

Quality of the RS hybrid forage was evaluated at the Blue Creek Station on six harvest dates, at three-week intervals beginning in late April. Neutral detergent fiber (NDF) of RS was 33.4% in April and 60% on the final date in August. In comparison, NDF of Greenar intermediate wheatgrass was 32.8% in April and 63.2% in August. The average NDF of Greenar (55.1%) was significantly higher than the hybrid (52.4%). Percent crude protein of the

hybrid was significantly lower than Greenar (21.5% vs 24.4%) in April; however, comparable values were obtained at the remaining five harvests. Percent crude protein of the hybrid at the six dates were 21.5, 16.6, 11.1, 9.1, 7.6, and 6.8%, respectively, with an average 12.1% Although NewHy begins growth early in the spring, it remains more succulent and palatable for livestock later in the growing season than most other wheatgrasses, especially on dryland range sites. In a trial in central Utah, cattle grazed NewHy in preference to all other entries in the trial including intermediate and crested wheatgrass. The hybrid recovers rapidly after grazing or defoliation and once established, it has excellent resistance to grazing pressure.

NewHy has been evaluated to a limited extent under irrigation. As in the range trials, problems with initial stand establishment were encountered, although these deficiencies were less pronounced under irrigation. During the second and third seasons after the year of establishment, however, the productivity of the hybrid compared favorably with other entries such as orchardgrass (*Dactylis glomerata*) and smooth bromegrass (*Bromus inermis*).

Although considerable variation exists among seedlots, seed quality tends to be somewhat lower than grasses such as crested and intermediate wheatgrass. Improved seed quality continues to be a breeding objective; however, until this deficiency is corrected it is recommended that seeding rates of from 9 to 12 kg/ha (8 to 10.5 lbs/acre) be used in its areas of adaptation. It should be noted that after emergence, seedlings are vigorous and establish themselves rapidly under relatively harsh conditions.

EXHIBIT C

OBJECTIVE DESCRIPTION OF VARIETY

'NewHy' RS Wheatgrass
Elytrigia repens X *Pseudoroegneria spicata*

Name of Applicant: K. H. Asay

Temporary Designation: RS Wheatgrass Variety Name: NewHy

PVPO Number:

1. SPECIES: The hybrid has been evaluated for meiotic regularity, salinity tolerance, drought resistance, forage and seed yield, seedling vigor, forage quality, and other agronomic traits on several field sites and in the laboratory. Evaluations were made in solid stands (sward) and spaced plants. This intergeneric hybrid has not been given a taxonomic or kind name and this is the first cultivar of the hybrid to be released. Due to its hybrid origin, NewHy expresses characteristics of both parental species and exhibits considerable morphological variation.

2. CYTOLOGY: Autoallohexaploid (2n=42); genome Constitution SSSSXX.

3. ADAPTATION: Western U.S.; saline soils; annual precipitation 33 cm (13 inches) and above; or irrigated pastures.

4. MATURITY: Approximately 7 days later than crested wheatgrass (*Agropyron desertorum*), similar to bluebunch wheatgrass (*Pseudoroegneria spicata*), 5-7 days earlier than intermediate wheatgrass (*Thinopyrum intermedium*), and 10 to 14 days earlier than tall wheatgrass (*Thinopyrum ponticum*).

5. PLANT HEIGHT: 65 to 115 cm (25 to 45 in).

6. GROWTH HABIT: Erect

7. RHIZOMES: Moderate to weak; midway between crested and intermediate wheatgrass.

8. LEAF BLADE:

   Color: Medium to light green
   Glaucosity (Sowing year): Absent
   Anthocyanin: Generally absent in mature plants
   Margins: Smooth; rolled inward
   Length: 11.5 to 15.5 cm
   Width: 2 to 6 mm

9. LEAF SHEATH:

   Anthocyanin (Seedlings): Often present
   Auricles: Glabrous
   Margins: Open

10. INFLORESCENCE (SPIKE TYPE):

Shape: Narrow to Tapering
Orientation: Erect
Anther Color: Yellow
Glume Color (50% Flowering): Green
Spike Length: 145 to 450 mm

11. LEMMA:

Length: 10 to 13 mm
Width: 1 to 3 mm
Awn Length: 2 to 9 mm

12. SEED (WITH LEMMA AND PALEA):

3,400 mg/1,000 seeds

13. DISEASE, INSECT, AND NEMATODE REACTION:

Moderately susceptible to Grass Billbug (*Sphenophorus parvulus*).

14. VARIETIES MOST CLOSELY RESEMBLING APLLICATION VARIETY:

NewHy is the first cultivar released of RS Wheatgrass.

United States Department of Agriculture
Agricultural Research Service

and

Utah Agricultural Experiment Station
Utah State University
Logan, Utah

and

United States Department of Agriculture
Soil Conservation Service

RELEASE OF 'NEWHY' RS WHEATGRASS, *ELYTRIGIA REPENS* (L.) NEVSKI X *PSEUDOROEGNERIA SPICATA* (PURSH) A. LOVE.

The Agricultural Research Service, U. S. Department of Agriculture, in cooperation with the Utah Agricultural Experiment Station, and the Soil Conservation Service announce the release of 'NewHy' RS Wheatgrass, (*Elytrigia repens* x *Pseudoroegneria spicata*).

The parental population of the RS hybrid was initially established in 1962 (Dewey 1967). The initial F_1 hybrid was pentaploid ($2n=35$), meiotically irregular, beset with chlorophyll deficiencies, and in general, had poor vegetative vigor. Although the hybrid plants were only partially fertile, adequate seeds were produced for generations to be advanced without chromosome doubling. From the F_1 to F_5 generation, selection was based largely on fertility (seeds/spike) and was restricted to plants with characteristics of both parental species. Plants with excessive rhizome development were excluded. More intense selection was initiated in the F_5 generation. The objectives were to combine the vigor, productivity, salinity tolerance, and persistence of quackgrass with the drought resistance, caespitose growth habit, seed quality, and forage quality of bluebunch wheatgrass.

Two F_7-F_8 germplasm pools, designated RS-1 and RS-2, were released to breeders in 1980 (Asay and Dewey 1981). These two lines were morphologically similar with the exception that RS-2 was slightly more rhizomatous than RS-1. Two additional cycles of selection were completed with the combined RS-1 and RS-2 breeding populations to develop the parental lines of the 'NewHy' cultivar.

The chromosome number of the NewHy has stabilized at $2n=42$ meiotic stability and good fertility has been achieved. Rate of phenological development is intermediate to the parental species and anthesis occurs from mid to late June in nurseries near Logan. The hybrid produced 560 kg of seed per ha on an irrigated site near Miles City, Mont. (Currie unpublished).

Degree of rhizome development in the RS breeding population readily responds to selection pressure (Asay and Hansen 1984). Essentially caespitose types have been derived after two cycles of selection. Rhizome development of the NewHy cultivar ranges from less than 0.1 m to slightly over 1.0 m per year on range sites receiving from 33 to 38 cm annual precipitation. On these sites, over 85% of the plants develop rhizomes of less than 0.4 m during the season

and the population averages approximately 0.3 m.

NewHy has demonstrated excellent resistance to excess soil salinity. In trials on a saline meadow near Miles City, Mont., the hybrid was more salt tolerant than Garrison creeping foxtail (*Alopecurus arundinaceus*), Altai wildrye (*Leymus angustus*), and Russian wildrye (*Psathyrostachys juncea*) (Currie et al. 1986). In greenhouse trials (Horton unpublished), NewHy was more tolerant of salinity than intermediate wheatgrass (*Thinopyrum intermedium*), western wheatgrass (*Pascopyrum smithii*), tall fescue (*Festuca arundinacea*), and Garrison creeping foxtail. Tall wheatgrass (*Thinopyrum ponticum*) was the only entry in these tests to have greater tolerance to salinity than NewHy (Tables 1 and 2).

The forage yield and quality of the RS hybrid has been evaluated on several range sites in the Intermountain West and to a lesser extent in the Great Plains. It is most productive on slightly saline or alkaline range sites receiving at least 33 cm of precipitation annually. Results from the Utah State University Experiment Station in NW Utah are typical. Poor seed germination resulted in stands of less than 50% during the establishment year. Consequently, dry matter yield of the hybrid was significantly ($P < 0.05$) less than 'Greenar' intermediate wheatgrass and 'Hycrest' crested wheatgrass during the following season (Table 3). As stands improved through tillering and rhizome development during the third and fourth years, NewHy produced more forage than any of the other 16 entries included in the trial. It is noteworthy that NewHy, unlike its quackgrass parent, did not spread beyond its plot borders into adjacent plots. Similar trends were observed in a trial established in the foothills of the LaSal Mountains in Southern Utah, at an altitude of 1,900 m and with an annual average of 33 cm precipitation. Although initial stands were better than at Blue Creek, forage yield of NewHy during the first production year was significantly less than the mean of the rest of the entries in the trial. In the two subsequent years, however, the productivity of the hybrid improved dramatically and was equivalent to the most productive entries in the trial (Table 4).

The hybrid has shown moderate susceptiblity to injury by the grass billbug (*Sphenophorus parvulus*) under soil and moisture conditions where this insect is a potential problem.

Quality of the RS hybrid forage was evaluated at the Blue Creek Station on six harvest dates, at three-week intervals beginning in late April. Neutral detergent fiber (NDF) of RS was 33.4% in April and 60% on the final date in August. In comparison, NDF of Greenar intermediate wheatgrass was 32.8% in April and 63.2% in August. The average NDF of Greenar (55.1%) was significantly higher than the hybrid (52.4%). Percent crude protein of the hybrid was significantly lower than Greenar (21.5% vs 24.4%) in April; however, comparable values were obtained at the remaining five harvests. Percent crude protein of the hybrid at the six dates were 21.5, 16.6, 11.1, 9.1, 7.6, and 6.8%, respectively, with an average 12.1% (Tables 5 and 6).

Although NewHy begins growth early in the spring, it remains more succulent and palatable for livestock later in the growing season than most other wheatgrasses, especially on dryland range sites. In a trial in central Utah,

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cattle grazed NewHy in preference to all other entries in the trial including intermediate and crested wheatgrass. The hybrid recovers rapidly after grazing or defoliation and once established, it has excellent resistance to grazing pressure.

NewHy has been evaluated to a limited extent under irrigation. As in the range trials, problems with initial stand establishment were encountered, although these deficiencies were less pronounced under irrigation. During the second and third seasons after the year of establishment, however, the productivity of the hybrid compared favorably with other entries such as orchardgrass (*Dactylis glomerata*) and smooth bromegrass (*Bromus inermis*).

Although considerable variation exists among seedlots, seed quality tends to be somewhat lower than grasses such as crested and intermediate wheatgrass. Improved seed quality continues to be a breeding objective; however, until this deficiency is corrected it is recommended that seeding rates from 9 to 12 kg/ha (8 to 10.5 lbs/acre) be used in its areas of adaptation. It should be noted that after emergence, seedlings are vigorous and establish themselves rapidly under relatively harsh conditions.

Breeders seed will be maintained by the USDA-ARS at Logan, Utah. Foundation seed will be produced from breeders seed by USDA-ARS at Logan and USDA-SCS at Los Lunus, New Mexico and will be available by Spring 1990. Foundation seed will be distributed by the Utah Crop Improvement Association and the USDA-SCS.

Certified seed may be produced only from Foundation seed. For information regarding supplies of Foundation seed contact:

Stanford Young
Utah Crop Improvement Assoc.
Plant Science Dep.
Utah State Univ.
Logan, UT 84322-4855

J. R. Carlson
USDA-SCS
West National Tech. Ctr.
511 NW Broadway, Room 547
Portland, OR 97209-3489

Because of the morphological similarity of NewHy seed to that of quackgrass, protection has been applied for under the Plant Variety Protection Act of 1970. Conditions of this license specifies that NewHy seed can be marketed only as a class of certified seed. Sale of non-certified seed of this protected cultivar [to anyone, including neighbors or friends,] is in violation of the Plant Variety Protection Act.

deleted 16 Sept 1993 per letter AAA

Release date for publicity purposes shall be effective on the date of the final signature of the release notice.

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K. H. Asay, D. R. Dewey, W. H. Horton, K. B. Jensen, P. O. Currie, W. T. Hansen II N. J. Chatterton, J. R. Carlson, and S. Young.

APPROVAL SIGNATURES:

DEC 18 1989
Date

Agricultural Research Service
U. S. Department of Agriculture

November 7, 1989
Date

Director
Utah Agricultural Experiment Stn.

12/5/89
Date

Soil Conservation Service
U. S. Department of Agriculture

Table 1. Shoot Weights (Percent of Check) of Seven Cultivars after 60 Days at Seven Levels of Soil Salinity in the Greenhouse.

Entry	Conductivity of Saturation Extract (mmhos/cm) 3	6	9	12	15	18	21	Mean
	Percent of Check							
Greenar	115.2	91.4	75.1	42.7	34.0	15.8	2.8	53.8
Rosana	98.3	79.1	59.7	45.7	28.8	13.1	7.5	47.5
Alkar	97.1	104.8	86.5	66.7	49.1	51.0	37.5	70.4
Hycrest	95.2	89.0	61.1	38.0	10.4	8.1	6.5	44.0
RS W.G.	**101.1**	**94.5**	**75.5**	**54.7**	**39.3**	**20.6**	**12.2**	**56.8**
Alta	94.6	80.7	57.8	39.0	21.5	11.4	3.4	44.1
Garrison	85.4	55.6	23.1	10.7	1.7	0	0	25.2
Mean	98.1	85.0	62.7	42.5	26.4	17.1	10.0	48.8
LSD (0.05)	NS	23.1	32.6	19.8	19.2	11.3	7.8	7.8

Table 2. Root Weights (Percent of Check) of Seven Cultivars after 60 Days at Seven Levels of Soil Salinity in the Greenhouse.

Entry	Conductivity of Saturation Extract (mmhos/cm) 3	6	9	12	15	18	21	Mean
	Percent of Check							
Greenar	83.0	61.4	34.8	11.7	10.8	3.1	1.1	29.4
Rosana	84.1	49.7	35.7	24.8	15.0	6.2	2.9	31.2
Alkar	107.9	91.1	54.0	35.6	16.7	17.1	10.3	47.6
Hycrest	86.7	50.3	24.6	20.0	4.6	5.1	3.3	27.8
RS W.G.	**89.1**	**79.5**	**59.2**	**33.2**	**24.7**	**10.3**	**6.3**	**43.2**
Alta	74.3	55.4	40.6	17.7	8.7	3.6	1.2	28.8
Garrison	63.4	33.7	7.6	3.6	.4	.0	.0	15.5
Mean	84.1	60.2	36.6	20.9	11.6	6.5	3.6	31.9
LSD (0.05)	NS	NS	25.0	9.6	9.2	4.6	3.9	7.4

Table 3. Percent Stand During Establishment Year (1984) and Forage Yield in Three Subsequent years. USU Bluecreek Experiment Farm.

Entry	Stand % 1984	Forage Yield (kg/ha) 1985	1986	1987	1985-87
Fairway CWG	78.8	1777	1660	1298	1578
Hycrest CWG	100.0	2559	2640	1901	2367
Nordan CWG	62.5	2058	2104	1865	2009
Syn-1 CWG	88.8	2410	2287	2133	2277
I-28 CWG	97.5	2364	1952	1632	1983
Swift RWR	77.5	1386	1867	1138	1463
Bozoisky-Sel. RWR	47.5	1363	2406	1440	1736
Vinall RWR	81.3	1431	1917	1189	1512
Syn A RWR	92.5	1638	2617	1360	1871
Syn B RWR	92.5	1442	1917	889	1416
I-19 RWR	87.5	1463	1945	937	1448
Greenar Int. WG	72.5	2800	2403	2274	2492
SL Hybrid	35.0	1147	1961	1672	1593
Secar BBWG	37.5	953	1509	1672	1378
Syn-1 WWG	47.5	1243	2063	1984	1763
Rosana WWG	65.0	1383	2162	1803	1783
NewHy	**48.1**	**1949**	**2862**	**2577**	**2462**
Mean	66.0	1756	2265	1757	1926
LSD (0.05)	14.8	559	994	662	569

Table 4. Percent Stand and Forage Yield of Ten Grasses on a Range Site on LaSal Mountain Foothills.

Entry	Stand (%)		Forage Yield (Kg/ha)				
	1985	1986	1985	1986	1987	1988	1985-88
Ephraim	100	100	696	931	764	951	835
Fairway	85	80	431	803	960	950	786
Nordan	95	95	619	1068	934	1874	1124
Hycrest Syn 1	95	95	850	1050	922	1656	1120
Hycrest Syn 2	100	100	1051	1103	1102	1901	1289
I 28	100	100	1036	1329	919	2145	1357
Des Syn	95	93	696	1228	688	2118	1182
P 27	93	88	558	1357	907	2769	1398
Greenar	90	88	633	1045	956	2715	1337
NewHy	**92**	**90**	**437**	**1212**	**1022**	**1982**	**1163**
Mean	88	84	677	1122	927	1913	1160
LSD (0.05)	7	6	198	315	260	667	318

Table 5. Percent Crude Protein of Seventeen Grasses at Five Harvest Dates. USU Blue Creek Experiment Farm.

Entry	Date 4/26	5/15	6/7	6/26	7/15	8/12	Mean
Fairway CWG	21.76	16.15	11.04	8.23	4.46	4.80	11.07
Hycrest CWG	20.70	13.79	8.50	5.73	4.12	3.93	9.46
Nordan CWG	23.38	16.69	10.06	8.13	5.76	5.11	11.52
A. Des Syn CWG	22.49	16.68	9.50	7.09	4.38	4.48	10.77
I-28 Syn CWG	19.58	13.95	8.63	7.11	4.04	3.96	9.54
Swift RWR	21.30	18.58	11.68	9.14	4.77	7.32	12.13
Bozoisky RWR	23.71	19.31	11.75	8.23	7.97	10.31	13.55
Vinall RWR	23.23	17.22	9.62	7.61	5.21	6.64	11.59
Syn-A RWR	21.87	17.75	10.84	7.09	4.33	5.53	11.23
Syn-B RWR	22.46	15.47	9.32	7.24	4.51	5.32	10.72
I-19 RWR	20.42	15.89	9.44	8.39	5.32	6.07	10.92
SL Hybrid	22.77	17.98	10.87	8.93	5.76	6.15	12.08
Secar	23.37	17.59	12.52	10.91	5.66	5.73	12.63
Western WG Syn	22.59	16.19	10.25	7.08	4.64	5.37	11.02
Rosana WWG	23.59	19.23	14.31	13.28	5.97	10.76	14.52
Greenar Int WG	24.39	17.69	13.03	9.27	7.06	8.26	13.28
NewHy	**21.53**	**16.55**	**11.13**	**9.07**	**7.57**	**6.80**	**12.10**
Mean	22.18	16.87	11.03	8.71	5.85	6.55	11.86
LSD (0.05)	3.46	3.32	2.14	2.90	1.67	1.81	1.40

Table 6. Neutral Detergent Fiber (NDF) of Seventeen Grasses at Five Harvest Dates. USU Blue Creek Experiment Farm .

Entry	Date 4/26	5/15	6/7	6/26	7/15	8/12	Mean
Fairway CWG	31.58	47.79	58.07	57.47	62.94	62.96	53.47
HYcrest CWG	31.94	47.47	58.06	58.96	62.86	59.58	53.15
Nordan CWG	29.74	46.62	57.82	58.85	64.28	61.53	53.14
A. Des Syn CWG	30.24	46.72	59.02	60.89	65.45	61.20	53.92
I-28 Syn CWG	33.43	47.34	57.88	62.06	62.49	62.44	54.27
Swift RWR	38.72	49.30	59.58	60.86	71.65	65.18	57.55
Bozoisky RWR	33.96	49.56	57.53	59.25	64.21	57.15	53.61
Vinall RWR	39.58	52.78	62.14	62.78	70.15	68.65	59.34
Syn-A RWR	34.01	48.23	58.82	60.48	69.46	68.25	56.54
Syn-B RWR	34.74	51.29	59.65	62.64	70.29	67.49	57.68
I-19 RWR	36.58	48.74	60.52	59.50	66.01	67.37	56.45
SL Hybrid	34.82	49.13	57.60	56.39	61.15	60.18	53.21
Secar	37.79	53.12	57.75	56.01	63.43	62.31	55.07
Western WG Syn	41.40	47.45	55.13	55.89	60.76	57.96	53.10
Rosana WWG	37.56	47.85	53.29	55.18	59.02	58.82	51.95
Greenar Int WG	32.81	47.89	57.58	62.39	66.83	63.21	55.12
NewHy	**33.38**	**46.10**	**55.19**	**56.82**	**62.93**	**59.98**	**52.40**
Mean	34.57	48.28	57.15	58.18	64.71	62.00	54.15
LSD (0.05)	2.44	2.09	2.50	4.89	4.71	3.91	1.24

EXHIBIT E

BASIS OF APPLICANT'S OWNERSHIP

'NewHy' RS Wheatgrass was originated and developed by employees of the Agricultural Research Service of the United States Department of Agriculture (USDA-ARS). By agreement between employees and the USDA-ARS, all rights to this variety are retained by USDA-ARS.

9000096

United States Department of Agriculture

Agricultural Marketing Service

Commodities Scientific Support Division

Plant Variety Protection Office
NAL Building, Rm. 500
10301 Baltimore Blvd.
Beltsville, MD 20705-2351

PLANT VARIETY PROTECTION OFFICE

Gentlemen:

Subject: Application No. 9000096
Variety and Kind: 'NewHy' RS Hybrid

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the Certificate on the above variety be issued with a notation on the Certificate that the right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is waived, except that this waiver shall not apply to breeders seed, foundation seed, labeling requirements, and blending limitations.

It has been agreed that the Certificate should be issued in the name(s) of:

Agricultural Research Service – U.S. Department of Agriculture
Utah Agricultural Experiment Station
Soil Conservation Service – U.S. Department of Agriculture

9/10/90
(Date)

K. H. Asay
(Signature)

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